indigo industry is to survive, *I. arrecta* must receive the phosphate it needs. So far as the cultural factor is concerned the future depends upon the indigo grower. Unless he is prepared to supply his plant with the food requisite for its vigorous thrift, and to do this without further demur and delay, the end of the war must mean the end of natural indigo, not in Bihar alone, but throughout India.

NOTES.

We regret to learn that the Natural History Museum is losing the services of Mr. W. R. Ogilvie-Grant, assistant keeper of the department of zoology and head of the Bird Room, who has been compelled to relinquish his appointment owing to continued ill-health. Mr. Grant has served in the museum for thirty-six years, having entered the department as an assistant in the year 1882. He is the author of the official catalogue of the game-birds, and joint author with the late Dr. R. Bowdler Sharpe of two other volumes of the great British Museum Catalogue of Birds. Mr. Grant was for many years editor of the Bulletin of the British Ornithologists' Club, and he carries with him in his retirement from official harness the good wishes and esteem of his many friends and brother ornithologists.

We learn from the Journal of the Washington Academy of Sciences that Dr. Cleveland Abbe, meteorologist of the U.S. Weather Bureau, and editor of the *Monthly Weather Review*, has been removed from his positions, the reason given being his "long-standing and generally well-known friendly sympathies for the Imperial German Government." It is stated that Dr. Abbe has denied disloyalty, and asked to be given an opportunity to reply to any charges presented.

Prof. C. A. Pekelharing has retired from the chair of physiological chemistry in the University of Utrecht, and has been succeeded by Dr. W. E. Ringer, one of his former assistants, and originally an inorganic chemist.

According to the *Nieuwe Courant* of August 24, Prof. Haeckel's house at Jena, Villa Medusa, will be transformed into a Haeckel museum and presented to the University. It will contain Haeckel's extensive collections, and be combined with an institute for general developmental theory. The Carl Zeiss foundation is giving financial aid.

The *Times* announces that Mr. V. Stefansson, the leader of the Canadian Arctic Expedition, has arrived at Dawson on his way to Ottawa. Mr. Stefansson's expedition left Esquimault in the summer of 1913 to explore the Beaufort Sea and adjacent islands of the Canadian Arctic Archipelago. It will be remembered that his chief vessel, the *Karluk*, was crushed in the ice in January, 1914. Three members of the expedition lost their lives on that occasion, Dr. Forbes Mackay, Mr. James Murray, and M. Henri Beuchat. Mr. Stefansson, with several members of his staff, was ashore at the time the *Karluk* broke adrift, and he continued the work of the expedition. The southern party, under the leadership of Mr. R. M. Anderson, returned in the autumn of 1916 after doing a considerable amount of work in the Mackenzie delta and the coast of the mainland to the east. Mr. Stefansson himself discovered new land north of Prince Patrick Island in June, 1915, and further land north-west of Banks Land in 1916. No news of his discoveries since that date has yet been announced, but Mr. Stefansson has probably been engaged in extending his explorations, in surveying his discoveries, and in studying the Eskimo. He announces that he intends to return to the Arctic in a year's time. There has been no news of Mr. Storkersen, a member of the expedition, who, with three Eskimo, left Herschell Island last winter in an attempt to reach Melville Island across the sea-ice, since April last, when he sent back word that he had gained a point 175 miles north of the Alaskan coast.

We regret to record the death of Lord Forrest, which occurred at sea last week on his voyage from Australia to England. Lord Forrest, better known as Sir John Forrest, was born in Australia of Scottish parents in 1847. He entered the Survey Department of Western Australia in 1865. In 1869 he undertook to search for traces of the German explorer Leichhardt. Though he failed in the main object of his expedition, Forrest made many discoveries. In 1870 he explored the south coast of Australia from Perth to Adelaide, and in 1874 he accomplished a journey through the heart of Western Australia. Starting from Champion Bay, he struck north-east to the Murchison River, which he followed to the Robinson Ranges, and then went along the 26th parallel to Peake Station on the overland telegraph, where he turned south and reached Adelaide. This remarkable journey of about 2000 miles was accomplished in five months, and proved that the interior of the colony was useless for settlement. In succeeding years Forrest surveyed the country between Ashburton and Lady Grey Rivers, and the Fitzroy district. From 1883 to 1890 he was Surveyor-General of Western Australia, and in 1890 became Premier. In 1901 he joined the Commonwealth Government, and served successively in several capacities. He had been a ceaseless advocate of a transcontinental railway, and regarded the completion of the line from Perth to Adelaide as the triumph of his political career. Lord Forrest was a gold medallist of the Royal Geographical Society and an LL.D. of Cambridge, Adelaide, and Perth.

By the death of Sir Ratan Tata, which occurred on September 5, at the age of forty-seven, a notable figure in the industrial and philanthropic life of India and England has disappeared. The son of Mr. Jamsetjee N. Tata, the well-known Parsi capitalist of Bombay, he married the daughter of Ardesir Merwanji Seth, the head of the priestly community of the Bombay Parsis. Mr. Jamsetjee N. Tata, who died in 1904, had planned various industrial enterprises, which he left to his sons, Sir Dorab Tata and Sir Ratan Tata, to bring to completion. One of these schemes was the establishment at Mysore of the Indian Institute of Research for the promotion of scientific, medical, and philosophical studies. His sons carried out his intentions, and provided a liberal endowment for the institute. Sir Ratan Tata's fame rests on his development of the Indian steel and iron works, for which the preliminary investigations were made at his expense by a staff of European and American experts. He and his brother, Sir Dorab Tata, carried out this enterprise, and founded the great metal works at Sakchi, the capital of which amounts to some millions sterling. Another scheme due to the brothers was to store and utilise the heavy rainfall of the Western Ghats for the supply of cheap and abundant electrical energy at Bombay, a work which has few parallels in other parts of the world. Sir Ratan Tata had long resided at York House, Twickenham, and at Versailles. In London he was deeply interested in scientific and philanthropic projects. He founded the Ratan Tata Department of

Social Science and Administration in the London School of Economics, and he established a fund of 1400*l*. per annum for the study of means to prevent and relieve destitution. He supported the Indian Moderate Party's programme of political reform in India, and received the honour of knighthood in 1916. It is fortunate that Sir Ratan's industrial enterprises are now under the competent supervision of his brother, Sir Dorab Tata.

THE death is announced, at the age of sixty years, of Dr. J. Harper Long, professor of chemistry at the North-Western University Medical School, Chicago, and a former president of the American Chemical Society.

THE recent death of Mr. W. Francis de Vismes Kane, of Drumreaske, Monaghan, Ireland, at the age of seventy-eight, is announced in the *Irish Naturalist* for July. Mr. Kane was well known to entomologists through his "Handbook of European Butterflies" (1885) and his "Catalogue of the Lepidoptera of Ireland" (1901), but his scientific interests were wide, as he attained distinction also as a student of the freshwater Entomostraca and of prehistoric archæology.

NEWS has just been received that Lieut. L. J. F. Oertling, who was reported missing on August 8, died on that date from wounds received in action. Lieut. Oertling was in the twenty-seventh year of his age, and was educated at Clifton College, afterwards entering the business of his father, Mr. Henry Oertling, the well-known manufacturer of chemical and other types of balances. He joined the Inns of Courts O.T.C. shortly after the outbreak of war, and obtained a commission in the Bedfordshire Regiment (T.), proceeding to France with the 8th Battalion. Eventually he became attached to the Royal Flying Corps.

PROF. FRASER HARRIS has now completed the history of the medical aspect of the great disaster at Halifax, N.S., on December 6, 1917. It is expected that the history and its appendices will be published under the auspices of the Halifax Relief Commission, a body appointed by the Canadian Government to take over the care of all matters arising out of the disaster.

THE Faraday Society has again arranged for a series of general discussions of important scientific subjects during the coming session. On November 4 the subject of discussion will be the occlusion of gases by metals; and that at the December meeting will be the present position of the electrolytic dissociation theory. After the New Year, discussions will be held on catalysis, the theory of flotation processes, and the scientific use of fuel. All these subjects are of wide interest on both the industrial and the scientific sides, and their discussion by competent authorities should have a stimulating influence upon their development. Communications are invited from investigators who have devoted particular attention to any of the subjects in the programme. The address of the society is 82 Victoria Street, S.W.1.

THE sixth annual meeting of the Indian Science Congress will be held in Bombay from January 13 to 18 next, under the patronage of Lord Willingdon, the Governor of Bombay, and the presidency of Sir Leonard Rogers, F.R.S. The sections and their presidents will be:—Applied Botany and Agriculture, the Hon. G. F. Keatinge; Physics and Mathematics, Dr. D. N. Mallik; Chemistry, Mr. F. L. Usher; Systematic Botany, Mr. S. R. Kashyap; Zoology, Mr. S. W. Kemp; Geology, Dr. L. L. Fermor; and Medical Research, Lt.-Col. Glen Liston. Further particulars of the meeting may be obtained from the hon. secretary, Dr. J. L. Simonsen, Indian Munitions Board, Simla.

AN editorial article in the *Geographical Journal* for September (vol. lii., No. 3) discusses some important points in the nomenclature of Himalayan peaks. It is the practice of the Survey of India to veto all names and employ only numbers to designate peaks. Mount Everest is the only exception. Even Godwin-Austen is not allowed in place of K^2 or its modern synonym Pk. 13/52A. Most of the peaks have no native names, and the difficulty in giving names seems to lie in finding ones that will harmonise with such as exist. The Survey of India rightly objects to trivial names which are out of keeping with the ranges as a whole. Cathedral Peak, Broad Peak, and so forth may be appropriate locally, but are unsuitable continentally, and in any case are not specific. The numbering of peaks on the system now adopted has the merit of indicating the degree-sheet on which the peak occurs. In the example cited above, 52A is the number of the degree-sheet and 13 the number of the peak. On the other hand, the system has obvious defects, the greatest, perhaps, being that numbers are difficult to remember, and give anonymity to the peaks. Mr. Hinks suggests eight figure-numbers giving latitude and longitude. That would involve greater precision, if a severer test of the memory, but introduces complications where two peaks lie close together and seconds have to be added. No doubt in time many of these peaks will receive names, despite official disapproval.

IN the July issue of the Journal of the Land Agents' Society there appears an article on "Wild Birds and Legislation," by Dr. W. E. Collinge. Although there will not be general agreement with the author in his conclusions that the question of wild-bird protection has never received really serious consideration, that the majority of the Wild Birds' Protection Acts have been ill-considered, and that no attempt has been made by those who advocate the protection of wild birds to understand the problems presented by wild-life, yet we thoroughly endorse his opinion that there is immediate need for a new and comprehensive Act—one that would afford protection to rare and vanishing species as well as to those birds which are beneficial, and would at the same time allow for the taking of adequate repressive measures against those species which are destructive and have become too numerous. As a matter of fact, a Departmental Committee was appointed by the Home Secretary in 1913 to consider what amendment in the law relating to wild birds and its administration might be required. This Committee held a number of meetings at which such questions as those raised by Dr. Collinge were freely discussed and considered, and many witnesses, representing all parties interested, were examined. The war, unfortunately, put a stop to the deliberations of the Committee, but it is to be hoped that when the Committee next meets it will be able to suggest lines on which a new Wild Birds' Protection Act, applicable to the whole of the British Isles, should be framed to replace the Act at present in force, with its perplexing supplementary Acts and the local Orders issued under them. The economic status of birds is now fully recognised, and it is high time that there should be created an Ornithological Bureau, similar in function to that long since established in the United States of America. To such a bureau should be referred all matters in connection with the administration of the Wild Birds' Protection Act, and the consideration of such modifications as may be necessary to meet special and local conditions.

THE American Museum of Natural History (New York) has just issued, as the first article of vol. xxxix. of its Bulletin, "A Revision of the Vespidæ of the Belgian Congo," by J. Bequaert. This is a systematic paper of more than usual importance, the generic and specific diagnoses being exceptionally detailed and carefully illustrated by structural drawings and coloured plates, and the classificatory facts being illuminated by many notes on behaviour and by valuable geographical discussions, with many distributional maps. It is pleasant to read in the author's introduction that when conditions in Europe deprived him of the fruits of all but a small part of his own collecting, he found ample materials for study in "the splendid collections of the American Museum Congo Expedition," as well as a hearty welcome and cordial assistance from the naturalists of the United States. From the same institution has been issued as a "Guide Leaflet" (No. 48) a popular pamphlet by C. E. A. Winslow and F. E. Lutz on "Insects and Disease." The facts and methods of germ-transmission by insects are clearly set forth, and illustrated by good photographs of specimens and models exhibited in the American Museum.

IN the latest part of the *Science Reports* of the Tohôku Imperial University, Japan (Second Series, Geology, vol. iii., No. ii., 1918), Prof. H. Matsumoto has several interesting notes on the fossil mammals of Japan. A new molar tooth of an elephant from Kaza seems to be exactly intermediate between the molars of Elephas and Stegodon. Part of the lower jaw of an ancestral deer, probably of Lower Miocene age, is referred to a new species of Amphitragulus, and is unusually large. An elaborate study of some skulls and frontlets of bison from the Pleistocene of Japan shows that they belong to the extinct species *Bison occidentalis* and *B. crassicornis*, which are already known from North America (chiefly Alaska) and Siberia. A discussion of the skull and teeth of the remarkable Miocene sirenian Desmostylus is especially valuable. Good specimens have now been obtained both from the Pacific coast of North America and from Japan, so that instructive comparisons can be made. The Japanese species is the largest sirenian known, with a skull 90 cm. in length. It seems to have frequented estuaries rather than open seas, and its peculiar front teeth were probably used like those of a hippopotamus to dig up nutritious plants from mud. The molars are especially effective grinding teeth, and are sufficiently deepened to last during a long life.

PROF. CHAS. CHILTON, who described the first species of Phreatoicus in 1883, has added an interesting chapter to the history of this crustacean genus by giving a description (Journ. Proc. Roy. Soc. N.S. Wales, vol. li., pp. 365–88, 1918) of a fossil species based on ten impressions found in the Wianamatta Shale (probably Upper Trias) of Queensland. Although none of the specimens are complete, the head and the first peræopods not being clearly represented in any of them, the evidence afforded by the remainder of the animal, which is in a good state of preservation, leaves no doubt as to the correctness of the identification. The fossil species, described as new under the name *Phreatoicus wianamattensis*, was similar in general appearance to *P. australis*, and reached a length of 30 mm. The living members of the Phreatoicidea, a primitive group of the Isopoda, are found in the fresh waters of Australia, Tasmania, New Zealand, and South Africa.

THE Geological Survey of Hungary has published the first volume of a new serial named *Geologica Hungarica*. It is a handsome quarto of 450 pages in the Magyar language, and is well illustrated by 275 text-figures and 26 plates of fossils. It comprises three parts, dealing respectively with Oligocene Mollusca, Tertiary Echinoids, and Callovian Ammonites. The last part is by the director of the survey, Dr. L. Loczy, and concludes with a valuable stratigraphical table showing the various Hungarian equivalents of the Lower and Middle Oolites of western Europe.

THE past summer has, for the most part, been agreeable and pleasant from a meteorological point of view, although the totals and averages of the several elements, and of the rainfall especially, have been liable to mislead and to give a somewhat unsatisfactory impression. Some of the meteorological happenings were abnormal, but they have, on the whole, proved to be an advantage. Combined records for the three months, June, July, and August, show a general deficiency of rain except in the north of Scotland and in the south-east of England. In the neighbourhood of London the aggregate rainfall for the three months was about 9 in., which is nearly 2·5 in. more than the normal, although about 2 in. less than in 1917, and it has only been exceeded in one other summer, 1903, since 1890, in twenty-eight years. June had a decided deficiency of rain over the British Isles, and chiefly so in England, where it was mostly less than 50 per cent. of the average, but July was excessively wet, yielding generally over the kingdom an excess of nearly 50 per cent. of the average, whilst August has yielded a total far below the normal. In July thunderstorms were phenomenal over England, and at Kew Observatory they occurred on nine days, being more frequent than in any July since 1880. In London the mean temperature for the summer was 61·5°, the mean maximum reading being 10° higher and the mean minimum 10° lower than the mean temperature, these results being not very different from the average, but, on the whole, there has been an absence of hot days. Sharp ground-frosts occurred in many parts of England, especially in the eastern, central, and south-eastern districts, on several occasions in June, and their effects are distinctly traceable. Over the country generally there has been during the summer a slight deficiency of temperature. The sunshine has not differed very materially from the average.

THE *Cairo Scientific Journal* (vol. ix., No. 100, January to March, 1917) contains an account by the late Prof. Kr. Birkeland of simultaneous observations of the zodiacal light by himself and an assistant, the one at Helwan in Egypt, the other at Salisbury in Southern Rhodesia. The stations possessed the same longitude, 31° E. of Greenwich, while differing nearly 48° in latitude. The observations discussed were made on sixteen occasions between July 8 and September 2, 1915, but the results are treated as preliminary, the hope being expressed of repeating them at more suitable stations at a more favourable season, adopting an improved photographic method. The observational results are shown in a number of figures, and it is claimed that they show two definite results—first, that the height of the visible light column was much greater at Salisbury than at Helwan, and, secondly, that there was a considerable relative displacement of the light columns, to the north at Helwan, to the south at Salisbury. There are numerous references to Prof. Birkeland's theoretical views, which associate the zodiacal light with the earth's magnetism. He apparently believed in the existence of "a *principal* ray system, a lenticular nebula round the sun which scatters the sunlight, and of a *secondary* scattering ray system round the earth, captured from the principal solar system by the earth's magnetism." In Prof. Birkeland's view, "a nebulous ring round the earth will *alone* never give any satisfactory explanation of the zodiacal light."

THE water supply to the town of Hobart, Tasmania, was the subject of an article in the *Engineer* of September 6. The reservoir has a capacity of 207 million gallons, and the dam is an interesting instance of two gravity wings with an intervening arch section. The wings are 293½ ft. and 203½ ft. long respectively, in straight lengths, and the arch is 232¾ ft. long, with a radius of 200 ft. The wings and the arch are not actually connected; a 6 in. by 6 in. bitumen joint, with sheet-lead faces, forms a watertight key from ground-level to the top of the dam. The maximum depth from the summit of the arch section in the centre to the foundation is 201 ft. The greatest depth of water in the reservoir is 95 ft., and the surface-level is 905 ft. above sea-level. The dam is constructed of concrete, and the arched portion is reinforced with iron rails, both vertically and horizontally. The thickness of the arch at the top is 6 ft., and at the bottom 54 ft. An unforeseen fissure in the foundation necessitated the sinking of a shaft to a depth of 185 ft. below the ground-level; this was refilled with concrete.

L'Aérophile for May gives a description of the Vincent multiplex compass which, it is claimed, combines in one small case all instruments required by the aviator, the navigator, and the explorer for the determination of magnetic declination and for the solution of astronomical, geodetic, and topographical problems required for determining position and directing the course of travel. It is also claimed that this compass provides a means of steering craft overseas with a precision hitherto unknown. The compass is provided with a reference line or directrix, which may be rotated, a movable index card with sights for the measurement of angles and azimuths, and a style for the solution of time problems. The whole compass is suspended on gimbals inside a box, which is pivoted on a slab. The box carries on one of its faces a needle and a dial, and on its bottom a second needle, which moves over degree graduations on the slab. The method of using the compass is explained.

A FRENCH Electrotechnical Commission has just published, in English and French, the results of an investigation on aluminium. The mechanical and physical tests give the density, coefficient of expansion, breaking stress, and elongation. Chemical analyses were also made. According to the *Revue Générale de l'Electricité* for June 8, the electrical measurements were made at the *Laboratoire central d'Electricité*, and include resistivity and temperature-coefficient of commercial aluminium. A table is given in which the constants for three different samples of aluminium, containing slightly different amounts of impurities, are set out.

DR. P. LINDNER, of Charlottenburg, has taken out a German patent (*Chemiker-Zeitung*, June 29) for obtaining fat from low forms of animal life. By populating suitable waste material with these minute forms he obtains material from which fat may be extracted. As examples he mentions decaying mushrooms and non-edible fungi, putrefying meat, gutter refuse, etc., grass and spoilt hay, masses of dead leaves infested with plant-lice, and stale yeast. Dr. Lindner further states that certain materials may be inoculated with the germs of bacteria or micro-fungi and cultivated. The mass of prepared material is triturated and mixed with water, then heated, and the fat skimmed off; or it may be recovered chemically by treating the triturated mass with a solvent.

WE learn from a note in the Journal of the Society of Chemical Industry for August 15 that the giant kelp of the Pacific Coast is now being utilised on a very large scale for the production of both potash and acetone. The works, which are situated at Potash, near San Diego, California, cover thirty acres of ground and give employment to 1000 men. Acetone, rather than potassium compounds, has become the chief product; it is required for the British authorities, and is of excellent quality. Among the subsidiary products recovered are ethyl propionate and ethyl butyrate, which are now being obtained on a scale never before approached. These compounds serve as solvents, and are especially valuable just now as substitutes for amyl acetate, on account of the necessity for conserving acetates. The quantity of kelp cut last year was about 24,000 tons a month.

THE Cambridge Scientific Instrument Co., Ltd., has issued a new list (No. 137) dealing with the Cambridge microscope lathe-attachment. This is a device recently placed on the market to aid in tool-setting for the production of exact and interchangeable screw-threads. The attachment consists of a compound microscope fitted with an eyepiece that is capable of being focussed on a diaphragm ruled with two fine lines representing the thread-angle of the tool to be used, and with a third line equally inclined to them. When the third line is set parallel to the axis of the cylinder to be threaded, the two intersecting lines represent accurately the position in which the tool must be set. The device is rigidly fixed to the slide-rest, consequently both move together. The standard diaphragm is engraved with a 55° angle. The inaccuracy of tool-setting by this method should not exceed 0° 3′. The list describes also the Cambridge alignment tester for ensuring the correct alignment of machine-tool beds within close limits. In this instrument a microscope fitted with a micrometer eyepiece is used to view a fine wire stretched along the length of the bed. One division of the micrometer scale corresponds with 1/2000″, so that high accuracy is obtainable.

AN outstanding feature of Catalogue No. 175 just issued by Messrs. W. Heffer and Sons, Ltd., Cambridge, is a number of books printed at special presses such as the Kelmscott, Doves, Riccardi, and others. Sections appealing more particularly to readers of a journal such as NATURE are devoted to agriculture, botany, geology, mathematics, physics and chemistry, zoology and biology, physiology, anatomy, and medicine.

THE following works are in the press for publication by the Carnegie Institution of Washington:—"Human Vitality and Efficiency under Prolonged Restricted Diet," by Benedict, Miles, Roth, and Smith: "A Biometric Study of Basal Metabolism in Men, Women, and Children," by J. A. Harris and F. G. Benedict; "Effect of Alcohol on Psycho-physiological Functions," by W. R. Miles.

MESSRS. CHARLES GRIFFIN AND CO., LTD., will publish shortly "A Treatise on British Mineral Oil," by E. H. Cunningham Craig, A. G. V. Berry, Dr. A. E. Dunstan, Dr. Mollwo Perkin, and A. Campbell. The work will contain a foreword by Sir Boverton Redwood, Bart., and be edited by J. A. Green.

THE article by Dr. James Ward on "Psychology" in the "Encyclopædia Britannica" has been expanded by the author, and will be published shortly in book form by the Cambridge University Press.